1.

Variables :

X1 = number of collegiate bags
X2 = number of mini bags
Y = maximum profit

Objection Function :

Y = 32(unit profit)x1(number of collegiate bags) + 24(unit profit)x2(number of mini bags)

Y = 32x1 + 24x2

Constraints :

Labor is measured in hours, so the labor in each bag needs to be converted.

X1 requires 45 minutes of labor which is 3/4 hours
X2 requires 40 minutes of labor which is 2/3 hours

$3x1 + 2x2 \leq 5000$

This is telling us that the 3 square feet of nylon is required for each unit of collegiate bags and 2 square fit of nylon is require for the mini bags.

Labor : X1(3/4) + X2(2/3) =

35 x 40 = 1400 (hrs of production)

X1(3/4) + X2(2/3) ≦ 1400

2.

Variables :

X = # of units produced by plant 1
Y = # of units produced by plant 2
V = # of units produced by plant 3

x1 = Number of units of the large size produced by Plant 1
x2 = Number of units of the medium size produced by Plant 1
x3 = Number of units of the small size produced by Plant 1
y1 = Number of units of the large size produced by Plant 2
y2 = Number of units of the medium size produced by Plant 2
y3 = Number of units of the small size produced by Plant 2
v1 = Number of units of the large size produced by Plant 3
v2 = Number of units of the medium size produced by Plant 3
v3 = Number of units of the small size produced by Plant 3

Maximize :

Z = 420(x1+y1+v1) + 360(x2+y2+v2) + 300(x3+y3+v3)

Capacity Constraints :

x1+x2+x3 ≤ 750 (plant 1)
y1+y2+y3 ≤ 900 (plant 2)
v1+v2+v3 ≤ 450 (plant 3)

Storage Space Constraints :

20x1+15x2+12x3 ≤ 13,000 (plant 1)
20y1+15y2+12y3 ≤ 12,000 (plant 2)
20v1+15v2+12v3 ≤ 5,000 (plant 3)

Constraint for large sz :

x1+y1+v1 = 900

Constraint for medium sz :

x2+y2+v2 = 1200

Constraint for large sz :

x3+y3+v3 = 750

Non-negativity constraint:

x1,x2,x3,y1,y2,y3.v1,v2,v3 ≥ 0